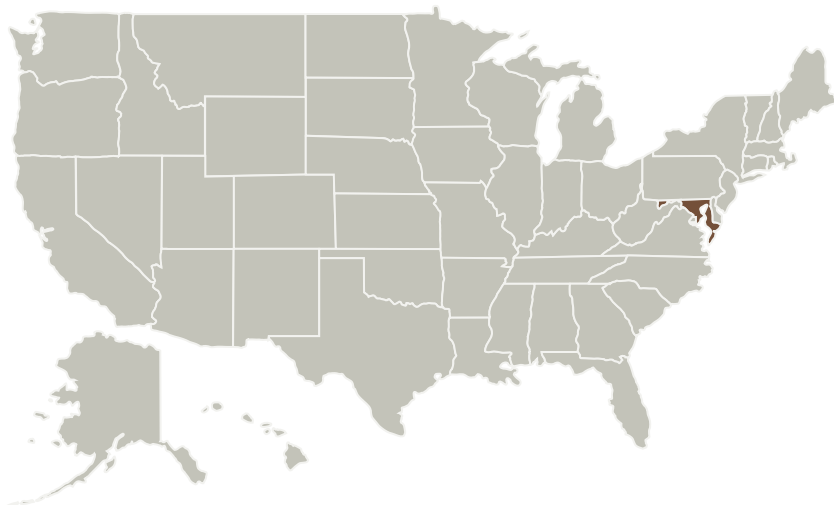## Project Introduction

Near-Earth object identification and characterization via spacecraft currently relies on collecting a large number of images, downlinking all of the images to Earth, and then using image processing algorithms on the ground to analyze the data sets. This mission architecture requires large amounts of storage on the spacecraft, high downlink bandwidth, and introduces a long turnaround time for follow-up operations by the same spacecraft platform. This is untenable for platforms that operate under heavy constraints of mass, power, and storage as well as spacecraft in orbits with minimal communication opportunities. To facilitate these types of missions, we are developing terrestrial image analysis algorithms optimized for the spacecraft computing environment to autonomously identify and track near-Earth objects. We are applying these algorithms toward image training data from previous missions to acquire performance metrics, including how the algorithms scale to the reduced processing power of a spacecraft computer.

## Anticipated Benefits

We are developing terrestrial image analysis algorithms optimized for the spacecraft computing environment to autonomously identify and track near-Earth objects. We are applying these algorithms toward image training data from previous missions to acquire performance metrics, including how the algorithms scale to the reduced processing power of a spacecraft computer.

## Primary U.S. Work Locations and Key Partners



Detection, Tracking, and Identification of Asteroids through On-board Image Analysis

## Table of Contents

# Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Responsible Program:**

Space Technology Research Grants

| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Johns Hopkins University | Supporting Organization | Academia | Baltimore, Maryland |

| Primary U.S. Work Locations |
|---|
| Maryland |

## Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

## Project Management

**Program Director:**

Claudia M Meyer

**Program Manager:**

Hung D Nguyen

**Principal Investigator:**

Gregory D Hager

## Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| | Applied Research | | Development | | | Demo & Test | | |
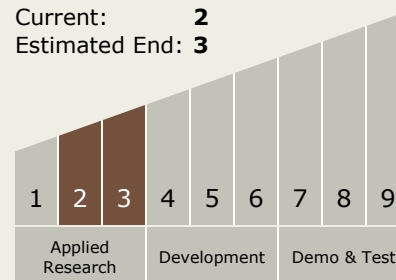
## Technology Areas

**Primary:**

- TX17 Guidance, Navigation, and Control (GN&C)
  └ TX17.2 Navigation Technologies
    └ TX17.2.1 Onboard Navigation Algorithms

**Tech Port**

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For more information and an accessible alternative, please visit:
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Page 2